

## **EROSION CONTROL**

**\*\* excerpts from \*\***

**City of Longview  
Drainage Criteria  
Erosion Control Manual**

## **EROSION CONTROL**

The City of Longview has an ordinance relating to erosion control. This ordinance was passed by the City Council on March 12, 1992, and is identified as Chapter 43 "Flood Damage Prevention" in the March 14, 1996 Code of Ordinances. The purpose of the ordinance is to prevent pollution of the City's streams and waterways by silt that washes from construction sites during periods of rainfall.

The City has a second ordinance (No. 1870) which was passed on November 25, 1986, and requires citizens to refrain from dumping or depositing or allowing mud, debris, or sediment to erode unchecked from residential or commercial construction sites onto the City's rights-of-way.

To assist you in this effort, we are furnishing you with copies from the City's "Drainage Criteria and Erosion Control Manual". These sheets indicate methods for controlling erosion and keeping soil from being washed off your property.

George Whipkey, of the City Engineering Division, is responsible for checking building sites within the City to insure that the ordinance is being observed. If you have questions concerning erosion control, please check with George at 237-1065. The best times to call are between 8:00 a.m. to 8:30 a.m., 1:00 p.m. to 1:30 p.m., and 4:30 p.m. to 5:00 p.m.

3.0 SEDIMENTATION AND EROSION

One of the most significant impacts associated with urbanization of undeveloped areas is an unhealthy acceleration of the natural processes of erosion and sedimentation. This impact is experienced primarily for two reasons. First, increased impervious cover and drainage efficiency in developed areas yield increased peak runoff flow rates and more frequent erosive velocities in natural channels. Second, earth disturbance associated with construction activity typically exposes unprotected soils to washoff and deposition in receiving waters and impoundments.

This section will present City of Longview sedimentation and erosion protection requirements for both temporary and permanent erosion control applications.

3.1 TEMPORARY EROSION PROTECTION - LAND DISTURBANCE/  
CONSTRUCTION SITES

Erosion and sedimentation prevention at excavation and/or embankment sites calls for temporary measures to be implemented during the project duration and until the disturbed area is adequately stabilized. There are a great many acceptable approaches available for providing adequate protection. This subsection will describe those methods recommended by the City of Longview. Use of other strategies is acceptable pending approval from the Office of the City Engineer. Design criteria and standard specifications for implementation of erosion and sedimentation controls is presented in the City of Longview publication, "Standard Specifications Manual." In all cases, erosion control measures must be in place prior to the start of any land or structure disturbance activity.

It is suggested the engineer consult SCS publication, "Erosion and Sediment Control Guidelines for Developing Areas in Texas," (SCS, 1976) for guidance with respect to proper procedures.

3.1.1 General Design Considerations for Land Disturbance Sites

Adherence to the following general design considerations will serve to minimize erosion and sedimentation impacts at land disturbance/construction sites.

- Limit the size of disturbed areas to the greatest extent possible
- Stabilize disturbed areas as soon as possible
- Minimize runoff velocities
- Protect steep areas and disturbed areas from upstream runoff
- Capture sediment at the project site
- Promote sheet flow as opposed to channelized or gulley flow to the extent possible
- Preserve and protect existing vegetation to the extent possible

3.1.2 Listing of Acceptable Strategies

3.1.2.1 Diversion Dike

A diversion dike is a temporary ridge of compacted soil immediately above cut or fill slopes and constructed with sufficient grade to provide drainage. The purpose of a diversion dike is to intercept storm runoff from small upland areas and divert it from exposed slopes to an acceptable outlet. The diversion dike is used for the period of construction at the top of newly constructed slopes to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized.

3.1.2.2 Interceptor Dike

An interceptor dike is a temporary ridge of compacted soil, located across disturbed areas or rights-of-way. The purpose of an interceptor dike is to shorten the length of exposed slopes, thereby reducing the potential for erosion, by intercepting storm runoff and diverting it to a stabilized outlet or sediment trapping device.

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Interceptor dikes are constructed across disturbed rights-of-way such as for utility lines and streets or disturbed areas such as graded parking lots or landfills. The dikes should remain in place until the disturbed areas are permanently stabilized.

### 3.1.2.3 Perimeter Dike

A perimeter dike is a temporary ridge of compacted soil located along the perimeter of the site or disturbed areas. The purpose of a perimeter dike is to prevent offsite storm runoff from entering the disturbed area and to prevent sediment-laden storm runoff from leaving the construction site or disturbed area.

The perimeter dike is used for the period of construction at the perimeter of the disturbed area to transport sediment laden water to a sediment trapping device such as a sediment trap or sediment basin. This dike shall remain in place until the disturbed area is permanently stabilized. The storm runoff prevented from entering the disturbed area by the perimeter dike shall be adequately handled to prevent damage due to flooding or erosion to adjacent property.

### 3.1.2.4 Hay Bale Dike

A hay bale dike is a temporary barrier constructed with hay bales with a life expectancy of 3 months or less, installed across or at the toe of a slope. The purpose of a hay bale dike is to intercept and detain small amounts of sediment from unprotected areas of limited extent.

The hay bale dike is used where:

1. No other practice is feasible, and
2. There is no concentration of water in a channel or other drainageway above the barrier, and
3. Erosion would occur in the form of sheet and rill erosion, and
4. Contributing drainage area is less than one-half acre and the length of slope above the dike is less than 100 feet. The practice may also be used for a lone,

single-family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than 1 acre and the length of slope above the dike shall be less than 200 feet.

#### 3.1.2.5 Rock Berm

A rock berm is a temporary berm constructed of open graded rock installed at the toe of a slope, the perimeter of a developing area, or across a small drainage channel. The purpose of a rock berm is to intercept sediment-laden water from unprotected areas, detain the sediment and release the water (in sheet flow for perimeter applications).

The rock berm is used where:

1. There is an adequate source of rock on or near the site, and
2. The contributing drainage area is less than 5 acres.

#### 3.1.2.6 Silt Fence

A silt fence is a temporary barrier fence made of burlap or polypropylene material which is water permeable but will trap water-borne sediment. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of limited extent.

Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence shall remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or other drainageway.

3.1.2.7      **Interceptor Swale**

An interceptor swale is a temporary excavated drainageway located across disturbed areas or rights-of-way. The purpose of an interceptor swale is to shorten the length of exposed slopes, thereby reducing the potential for erosion, by intercepting storm runoff and diverting it to a stabilized outlet or sediment trapping device.

Interceptor swales are constructed across disturbed rights-of-way, such as for pipe lines and streets or disturbed areas such as graded parking lots or land fills. The swale shall remain in place until the disturbed areas are permanently stabilized.

3.1.2.8      **Perimeter Swale**

A perimeter swale is a temporary excavated drainageway located along the perimeter of the site or disturbed areas. The purpose of a perimeter swale is to prevent offsite storm runoff from entering the disturbed area and to prevent sediment-laden storm runoff from leaving the construction site or disturbed area.

The perimeter swale is used for the period of construction at the perimeter of the disturbed area to transport sediment-laden water to a sediment trapping device such as a sediment trap or sediment basin. This swale shall remain in place until the disturbed area is permanently stabilized. The perimeter swale also is used to prevent storm runoff from entering the disturbed area. This runoff shall be adequately handled to prevent damage due to flooding or erosion to adjacent property.

3.1.2.9      **Sediment Basin**

sediment basin is a temporary barrier or dam constructed across a waterway or at other suitable locations to intercept sediment-laden runoff and to trap and retain the sediment. This standard applies to the installation of temporary sediment basins on sites where: (1) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or

service of public roads or utilities; (2) the drainage area does not exceed 100 acres, and (3) the basin is to be removed within 36 months after the beginning of construction of the basin.

The purpose of a sediment basin is to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainage ways, properties, and rights-of-way below the sediment basin from siltation.

A sediment basin applies where physical site conditions or land ownership restrictions preclude the installation of erosion control measures to adequately control runoff, erosion, and sedimentation. It may be used below construction operations which expose critical areas to soil erosion. It remains in effect until the disturbed area is protected against erosion by permanent stabilization.

#### 3.1.2.10 Sediment Trap

A sediment trap is a small temporary basin formed by excavation and/or an embankment to intercept sediment-laden runoff and to trap and retain the sediment. The purpose of a sediment trap is to protect drainageways, properties and rights-of-way below the sediment trap from sedimentation.

A sediment trap is usually installed in a drainageway, at a storm drain inlet, or at other points of discharge from a disturbed area.

### 3.2 PERMANENT EROSION PROTECTION - CHANNELS AND OTHER DRAINAGEWAYS

In areas of potential or existing erosion problems along drainageways, acceptable erosion control methods must be employed. This subsection will outline permanent erosion control methodologies recommended for use in the City of Longview, including design and construction specifications.



3.2.1 Grass/Vegetation

Grassed channels are preferred in areas and drainageways with sufficient drainage right-of-way, moderate flow velocities and suitable soils for the establishment of vegetative cover. Maximum sideslopes shall usually be 3:1 unless a formal geotechnical investigation determines that unreinforced slopes may be steeper. Channel slopes must be revegetated immediately after construction to minimize erosion. Vegetation should be durable and require minimal maintenance. Revegetated ground cover in channels must be accepted by the City and the City may require topsoil placement if native soils are unsuitable. Acceptance shall not be granted until two years after channel construction completion.

If appropriate, a concrete or cellular grid paver pilot channel may be incorporated in a grassed channel. Pilot channels serve to limit erosion of the grassed channel by accommodating low to moderate flows.

Unless otherwise approved by the office of the City Engineer, Manning's "n" values for grassed channels shall not be less than 0.04 (0.035 in well-maintained condition).

3.2.2 Vegetation Stabilizers

Vegetation stabilizers refers to any of several blanket-type products used to protect newly grass-vegetated surfaces during the time necessary for the vegetation to become fully established. This includes jute, Enkamat, and Excelsior Mat, among others. These materials must be adequately staked to the channel sideslope.

3.2.3 Concrete Slope Paving

Concrete slope paving refers to the use of reinforced concrete along channel sideslopes, channel bottoms, at pipe/culvert outfalls and areas of high turbulence, to protect proposed grades against excessive erosion. Concrete-lined channels are often preferred in areas where available drainage right-of-way is limited.

Unless otherwise approved by the Office of the City Engineer, Manning's "n" values for concrete-lined channels shall not be less than 0.013.

3.2.4 Prepackaged Concrete Bagwall (R-Rap)

The term "R-Rap" refers to a patented prepackaged concrete riprap provided in biodegradable paper bags and stacked along channel sideslopes. R-RAP is typically reinforced on the sideslope with 6-inch, No. 3 rebar inserted vertically between adjacent bags and at the toe of the slope with a 4-foot, No. 6 rebar vertically traversing the bottom three levels of stacked bags. Once placed, individual bags are either left to be moistened via precipitation, or are hosed down to speed the curing process. The City does not promote the use of any one particular brand-name of product. The use of R-RAP by name is an example of something that has been used successfully in Longview. There are many other products that will be considered for use on an individual basis.

Unless otherwise approved by the Office of the City Engineer, Manning's "n" values for concrete bagwall-lined channels shall not be less than 0.035.

3.2.5 Concrete Slope Pavers

The term "Concrete Slope Pavers" refers to cellular concrete revetment grids generally placed along a channel slope to prevent erosion. They are typically perforated to allow vegetative growth, infiltration and exfiltration of water, and some deflection against localized stresses.

Unless otherwise approved by the Office of the City Engineer, Manning's "n" values for cellular grid-lined channels shall not be less than 0.04.

3.2.6 Stone Riprap

Stone riprap refers to a layer of loose rock or aggregate placed over an erodible soil surface. The purpose of riprap is to protect the soil surface from the erosive forces of water.

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Riprap may be used, as appropriate, at such places as storm drain outlets, channel banks and/or bottoms, roadside ditches, drop structures and shorelines.

Unless otherwise approved by the Office for the City Engineer, Manning's "n" values for stone riprap-lined channels shall not be less than 0.04.

3.2.7 Gabions

The term "gabions" refers to rectangular heavily-galvanized wire mesh baskets filled with graded rock. Gabion structures are generally built to be a homogeneous monolithic structure capable of providing erosion protection while absorbing unexpected or localized stresses without lessening the structure's integrity.

Unless otherwise approved by the Office for the City Engineer, Manning's "n" values for gabion-lined channels shall not be less than 0.04.

3.3 MATERIALS TO BE PROVIDED FOR CITY REVIEW

As a minimum, the following items will be included on the construction plans prior to their approval by the Office of the City Engineer.

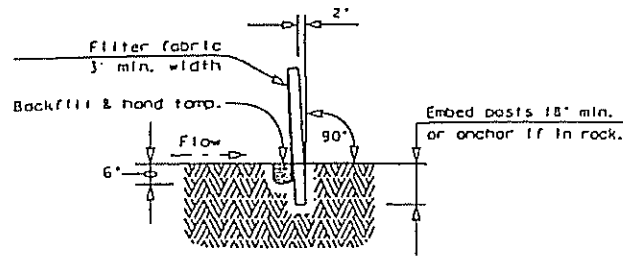
1. A sequence of development showing which phases of construction will be done at which time, and what specific controls are required during each phase of the development. In all cases, erosion controls must be in place prior to the start of any land disturbance activity.
2. A schematic representation of each control strategy required in the engineer's plan, with adequate dimensions and references to the specific detail in the standards contained in the City of Longview Standard Specifications Manual so that feature can be built as intended.

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3. Approved areas for construction traffic, parking, vehicular maintenance, and, if appropriate, vehicle washing.
4. Temporary spoils storage areas, including size, time of use, and ultimate restoration schedules.
5. Permanent spoils disposal areas, including size, depth of fill, and restoration procedures.
6. Contour maps showing lightly dashed lines for existing contours and solid lines for proposed contours, with each having a contour interval of two feet.
7. Restoration plans for all disturbed areas on the site that will include, as a minimum:
  - (a) seed type and rate of application,
  - (b) mulch type and rate of application,
  - (c) application technique,
  - (d) sod type,
  - (e) maintenance requirements for each specific area,
  - (f) contingency plan, if delays in construction upset the proposed timetable,
  - (g) whether the restoration is of a permanent or temporary nature,
  - (h) landscaping plan using a mixture of grasses, forbes and woody plants.
  - (i) method for stockpiling and reuse of topsoil excavated from site.
8. Specific locations where special slope stabilization techniques are to be utilized and the extent of the slope stabilization to take place.
9. The identify of the person or firm who will be responsible for the maintenance of each sedimentation/erosion control scheme being used on the project.

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10. A clear definition of criteria to be utilized in determining when acceptable restoration has taken place.
11. The location of any detention ponds on the construction site.
12. The location of any sedimentation or filtration ponds to be constructed on the site.
13. The name and phone number of the designated representative for the owner/engineer who will have the authority to make appropriate changes to the sedimentation/erosion plan, if it is discovered to be inadequate.
14. The length of time between start of rough-cutting and complete restoration may not exceed 12 months. If an applicant does not meet this deadline, the Office of the City Engineer will notify the applicant in writing that the City may complete the stabilization of disturbed areas at the applicant's expense, unless the applicant does so within 30 days of the day of notice, or unless the applicant provides acceptable erosion/sedimentation controls and the continuing maintenance thereof, acceptable to the Office of the City Engineer.
15. The owner/engineer shall conduct ongoing inspections of all erosion/sedimentation control methodologies and direct the person or firm responsible for the maintenance to make any repairs or modifications necessary to assure continued effective operation of each methodology.
16. No clearing or rough-cutting shall be permitted prior to final approval of the plan.
17. No clearing or rough-cutting for purposes other than those set out above, or for construction of temporary erosion and sedimentation controls, as per approved plan, shall be permitted until those controls are in place.



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

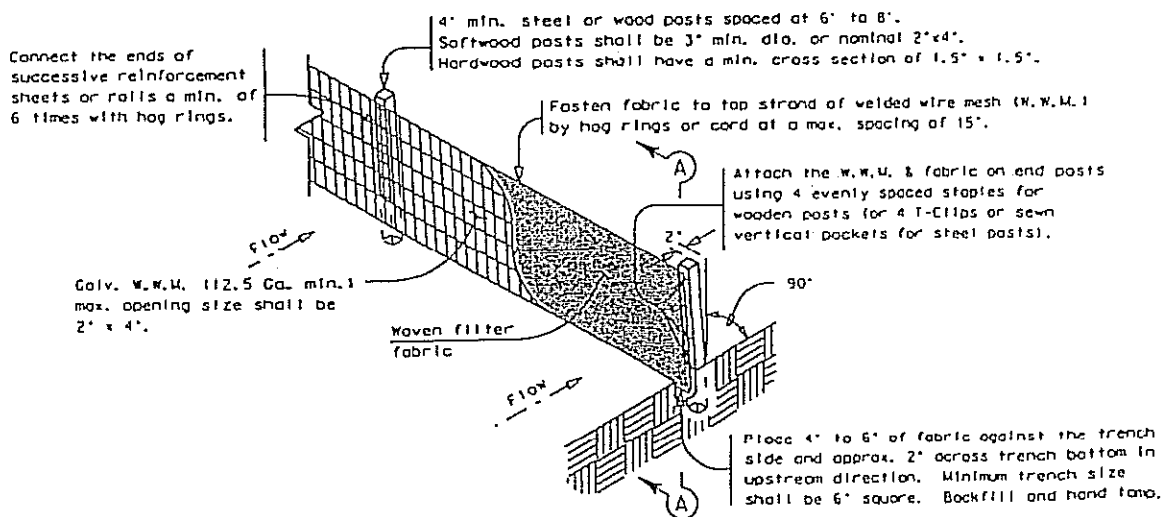
Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT<sup>2</sup>. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

PLAN SHEET LEGEND

Sediment Control Fence — (SCF) —

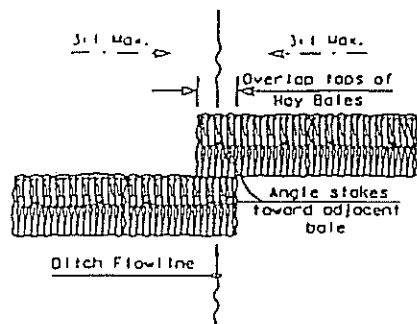
GENERAL NOTES

1. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

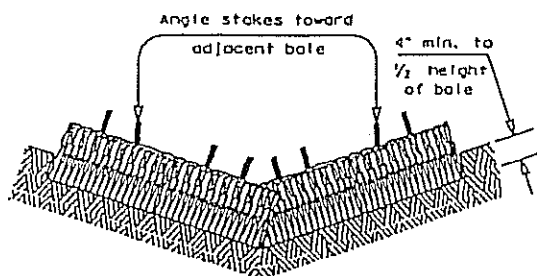


TEMPORARY SEDIMENT CONTROL FENCE

— (SCF) —



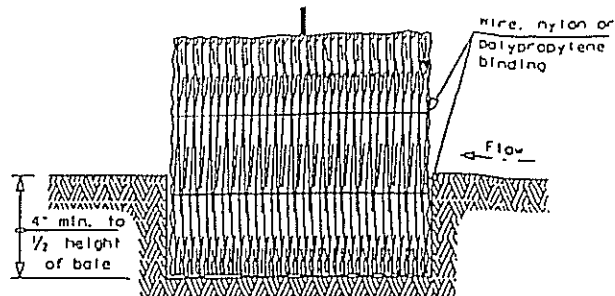
PLAN VIEW



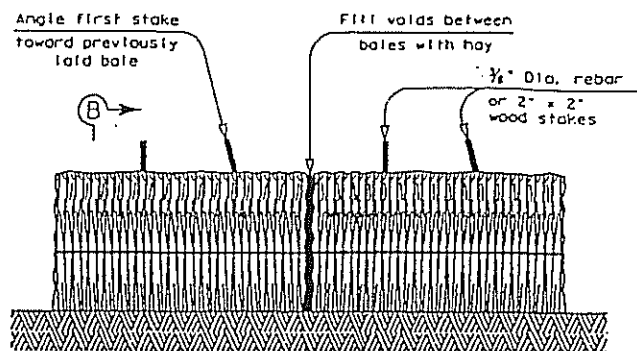
PROFILE VIEW

PLANS SHEET LEGEND

Baled Hay — (BH) —



SECTION B-B



BALED HAY FOR EROSION CONTROL

(BH)

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetable matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible  $\frac{1}{2}$  the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with  $\frac{1}{2}$ " Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

BALED HAY USAGE GUIDELINES

A Baled Hay Installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two-year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT<sup>2</sup> of cross sectional area. Baled hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 100'. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 50'.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than  $\frac{1}{2}$  acre.

For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch side slopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overlapping drainage when sediment has filled to the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.



TEXAS DEPARTMENT OF TRANSPORTATION  
**TEMPORARY EROSION,  
 SEDIMENT AND WATER  
 POLLUTION CONTROL MEASURE**  
 FENCE & BALED HAY

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